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Utah Agricultural College
EXPERIMENT STATION

Circular No. 25



Preserving Eggs For The Home

BY
BYRON ALDER

Logan, Utah, April, 1917.

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Preserving Eggs For The Home

BY BYRON ALDER.

The preserving of eggs in the home from the spring when they are so plentiful until fall and winter when they are so scarce, is by no means a new practice. Only a very few, however, are taking advantage of this practice and the full benefits are by no means being derived. During the past winter the high cost of eggs has brought this fact out very forcibly in some of the rural districts as well as in the larger cities where the price for a considerable time was from 50 to 60 cents a dozen and only a limited supply could be had at that price. The numerous inquiries for information on egg preserving during the past few months have emphasized the necessity for the publication of this circular.

Why Eggs Spoil

In order to appreciate fully the care necessary in preserving eggs, a little should be known of their structure, keeping qualities, and some of the common causes of spoiled, or bad, eggs. Most eggs when laid contain very few or no bacteria that would cause decomposition, and the entrance of these micro-organisms usually takes place because of carelessness or neglect on the part of those handling the eggs. One of the chief sources of infection is dirty or damp nests. .

Eggs, like milk, make an excellent place for bacterial growth and development and they spoil very readily when kept in dirty or unsanitary conditions. The shell of the egg is porous to admit the passage of air in and out, but it is coated with a mucilaginous matter which prevents the entrance of bacteria unless it is very old, wet, softened by moisture, or rubbed off. Therefore, eggs should not be washed, held in damp musty places, or handled more than necessary, and should be marketed or preserved as soon after laying as possible.

How to Prevent Loss

Bacterial development or decomposition can be prevented in two general ways: first, by keeping the eggs sterile by preventing the entrance of bacteria; second, by retarding the growth or development of bacteria either by shutting off the supply of oxygen by coating the shell or immersing it in a liquid or by low-

ering the temperature below the point at which this growth or development will take place, which is commonly called cold storage.

The quality of the egg is also seriously affected by the loss of moisture through evaporation. In the storage of eggs there are, then two main factors to be considered; to prevent decomposition, caused by the growth or development of bacteria or mould, and to avoid loss of moisture by evaporation.

Cold Storage

The cold storage business is no doubt the best where eggs and other products are handled on a large scale. This is quite successful if the temperature is held at, or slightly above the freezing point (33° to 35° F.) and the humidity of the storage room 75 to 80 to prevent evaporation. With these precautions good fresh eggs properly handled until put in storage would lose very little during storage from three to six months. A large part of the loss and poor quality in storage eggs is due to poor eggs that were not of the best quality to start with; holding such eggs for from three to eight months, even under the best possible conditions, does not improve their quality, but good fresh eggs of good quality can be held and the quality retained. Because of the expense and equipment necessary this method cannot be considered for the preservation of eggs in the home.

Methods of Preserving in the Home

A method for the home of the farmer, the poultryman, or the consumer must be simple, cheap, and must retain the good quality of the egg with few losses. About 135 years ago William Jaynes was granted letters of patent for an egg preserver and this method (limewater), slightly modified is still in use in many parts of the world. Since that time over 80 patents have been granted in England the majority have been, however, "only interesting experiments rather than practical methods."

J. H. Thieriot¹ reports that out of 20 methods experimented with in Germany, the three that gave the most satisfactory results were water glass, limewater, and coating the eggs with vaseline. The different preserving mixtures and methods tried with the results obtained were summarized by J. Vanderleek² as follows:

1. U. S. Consular Reports. Dec. 1897 pp. 563.

2. American Food Journal Vol. 6, 1911 No. 11 pp. 13.14.

"Of those preserved in limewater, water glass, or varnished with vaseline all were good; of those treated with permanganate of potash, or with boric acid and water glass, or packed in wood ashes, or in peat dust 20 percent were bad; of those varnished with shellac, collodin, or water glass 40 percent were bad; of those submerged in salicylic acid, treated with alum, or sterilized 12 seconds in boiling water 50 percent were bad; of those rubbed with salt, packed in brine, covered with paraffin or varnished with glycerin and salicylic acid 70 percent were bad; of those wrapped in tissue paper or preserved in salicylic acid and glycerin 80 percent were bad; and of those preserved in salt water all were unpalatable, as the salt had penetrated the eggs"

W. R. Graham³ reports the results of the following methods of preserving eggs: "(1) Immersion in solutions of water glass of different strength, (2) in lime solution, (3) coating with vaseline, (4) packing in salt, (5) packing in dry oats, (6) immersing in water glass and packing in egg cases after drying. The results obtained were in favor of lime water and water glass. Those coated with vaseline kept well but absorbed a very undesirable flavor of vaseline. Of those packed in salt only a small percentage were bad but all had lost considerable from evaporation. Eggs packed in oats were musty and had evaporated fully as much as those packed in salt; those coated with pure water glass were fairly well preserved but lacked flavor. In the same report for 1901 he gives the following: "In experiments with water glass, one to five; the eggs scored 44 out of a possible 50. Where water glass was one to seven, the eggs scored 43.2 out of 50. With lime and salt solution the eggs scored 40, and in lime water they scored 41. The eggs put up in salt scored 37, and the greased eggs put up in salt scored 38."

H. A. Brighan⁴ reports the following methods tested as preservatives for eggs: water glass, dry table salt, limewater and salt brine, vaseline, wood ashes, finely ground gypsum, powdered sulphur, powdered sulphur and sulphur fumes, permanganate of potash, salicylic acid, and salt brine with fertile and infertile eggs.

"Of the different methods tested in this series of experiments, the old way of using slacked lime and salt brine proved very effectual, and also has the advantage of being inexpensive. Of

3. Ontario Agr. College and Exp. Farms Report for 1899 pp. 130-134.

4. Rhode Island Sta. Rpt. 1901 pp. 297-373.

all the substances experimented with, the water glass proved most worthy of commendation. The eggs preserved in wood ashes were stale in taste. None were nice, though none were rotten."

The results of numerous other experiments conducted in the different states and in foreign countries could be cited, but since the results in all cases are practically the same this is not considered necessary. Of the many methods tried, two in nearly all cases have given almost complete or at least satisfactory results; these are water glass and lime water. A third, coating with vaseline, might be recommended were it not for the fact that if left for too long a time the egg absorbs a rather marked vaseline flavor. Other mixtures might be used to give the same results as obtained with vaseline without effecting the flavor but the objection of the time required to properly coat the eggs cannot be entirely overcome. Where only a few dozen eggs are preserved this is not important.

Some Results in Utah

During the last four years tests have been made with water glass, and very satisfactory results have been obtained. April 1, 1913 about 12 dozen eggs were placed in a crock jar and covered with a 10 per cent solution of water glass. The air cell was located by holding the egg before an ordinary egg tester and a fine pencil line drawn around its outer edge. Part of these eggs were tested during the winter and were found to be in very good condition. Some of them were kept in the solution until the latter part of June, 1914, when most of the eggs retained a fairly fresh appearance as far as ordinary observation could determine. There was no change in the size of the air cell.

It is not advisable, however, to keep them for so long. In some of the tests since that time the quality of the eggs has deteriorated rather rapidly after about eight to ten months of storage. The last two years water glass and the Flemming Egg Preserver, a patented compound for coating the eggs, have been compared and good results have been obtained with each. There seemed to be no difference in the eggs preserved with these two methods up until about five or six months of storage when the quality of the eggs preserved by the latter method seemed to go down more rapidly. Considerably more time is required in putting the egg down with this method as each egg must be carefully coated.

Method for Using Water Glass

Water glass can usually be obtained at any drug store and should not cost more than a dollar to a dollar and quarter a gallon. A gallon of water glass properly diluted and mixed should be enough to store about 60 to 70 dozen eggs.

Take 10 quarts of water that has been boiled for a few minutes and allowed to cool. When cold add 1 quart of good quality water glass and stir thoroughly. Let the mixture stand a short time, then give it another good brisk stirring. The water glass is heavier than water and will go to the bottom unless thoroughly mixed. This should give enough of the mixture to cover about 15 to 20 dozen eggs, depending on the shape of the storage vessel and the way the eggs are packed into it. If the eggs are carefully placed in the vessel on end and close together more eggs can be put in and less mixture required to cover them. This is not necessary, however, and it is sometimes more convenient to mix the solution, pour it into the preserving vessel and add the eggs, a few at a time, as they are gathered each day fresh from the nests.

Any good clean vessel can be used, but it is better to use one of wood, glass, or crockery than one of metal. A sweet clean barrel is good, where 50 dozen or more are to be preserved. A clean, cool, sweet cellar is the best place to put the containing vessel.

Use only fresh, clean eggs. If the shell is cracked the egg will always spoil.

All eggs must be completely covered by the water glass as long as they are in storage. If some of the liquid evaporates add more water. A good lid or cover on the containing vessel will prevent evaporation.

When water glass eggs are to be boiled stick a needle through the shell at the large end of the egg to prevent the shell from breaking.

The Lime Water Method

Tests for several years with different methods of preserving eggs have been carried on in Canada and the results obtained were in favor of the lime water, their method of using this preservative should give good results.

F. T. Shutt⁵ reports the following: "This fifth season's work with egg preservatives furnishes further corroboratory evidence

5. Canada Exp. Farms Reports for 1902 and 1903.

of the value of limewater. Of the solutions experimented with, it has proved the most satisfactory. It is certainly equal to water glass in effectiveness and is to be preferred to this much advertised preservative on the grounds of economy and ease of preparation."

"The solubility of lime at ordinary temperatures is 1 part in 700 parts of water. Such a solution would be termed saturated limewater. Translated into pounds and gallons, this means 1 lb. of lime is sufficient to saturate 70 gallons of water. However, owing to impurities in commercial lime, it is well to use more than is called for in this statement. It may not, however, be necessary, if good, freshly-burnt quicklime can be obtained, to employ as much as was at first recommended, namely, 2 to 3 lbs. to 5 gallons of water. With such lime as here referred to, one could rest assured that one lb. to 5 gallons (50 lbs.) would be ample, and that the resulting lime water would be thoroughly saturated.

The method of preparation is simply to slack the lime with a small quantity of water then stir the milk of lime so formed into the 5 gallons of water. After the mixture has been kept well stirred for a few hours it is allowed to settle. The supernatant liquid, which is now saturated lime water is drawn off and poured over the eggs previously placed in a crock or water-tight barrel.

As exposure to the air tends to precipitate the lime (as carbonate) and thus weaken the solution, the vessel containing the eggs should be kept covered. The air may be excluded by a covering of sweet oil or by sacking upon which a paste of lime is spread. If after a time there is any noticeable precipitation of the lime, the lime water should be drawn off or siphoned off and replaced with a further quantity newly prepared."

He also reports that the addition of salt to the lime water had no beneficial effect.

"Use only the very best of fresh eggs."

"All eggs must be completely covered by the lime water all the time they are in storage."

The containing vessel should be kept in a cool, dry, well ventilated cellar where possible.

SUMMARY

The preserving of eggs in the home is not a new practice and has passed the experimental stage.

There is no good reason why each farm home should not have all the eggs desired during the winter months at a low cost.

The quality of eggs properly preserved for a period up to six to eight months is practically as good as fresh eggs.

Eggs lose flavor and quality by bacterial action or decomposition, by the development of moulds, and by loss of moisture through evaporation. Preserving eggs is simply a method of control of these three factors.

Of the common methods tried, lime water and water glass seems most practical and gives the best results.

Salt, wood ashes, bran, oats and other dry mixtures do not prevent evaporation and the eggs thus lose in quality.

Flemming's Egg Preserver is better than vaseline and equal to lime water or water glass for preserving for short periods, three to six months.

"It has been found by analysis that the silica and ash content were no higher in eggs carefully preserved in water glass than in fresh eggs, and there is no loss of moisture, weight, or nutritive value."

Fertile eggs can be preserved as well as infertile if they are perfectly fresh and are stored in a cool place, temperature below 65° F., 33° to 45° F. is best for either.

All eggs for preservation should be clean, gathered often from good clean nests and treated as soon as possible after they are laid.

Lime water and water glass should be quite cold before the eggs are put in. Do not use either solution for the second time. Make fresh preserver for each year.

The shells of old eggs are more easily and quickly penetrated by moulds and bacteria than those of fresh eggs.

Dirty eggs, or eggs that have been washed, always spoil more readily than clean fresh eggs and should not be preserved by any method.

Only fresh eggs of good quality with good smooth sound shells should be used for preserving.

Cold storage eggs or eggs preserved by other methods should be sold as such and not as "fresh," or "new-laid" eggs.

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